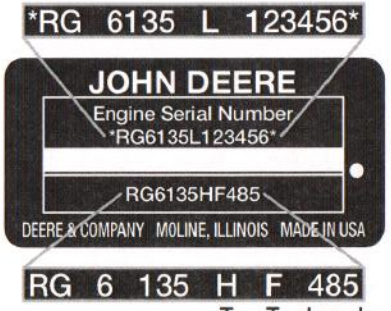
JOHN DEERE

Off-Highway Diesel Engine Ratings

Tier 3/Stage III A

Identification plate



Factory manufactured by

RG	Waterloo, Iowa, USA
CD	Saran, France
PE	Torreón, Mexico
PY	Pune, India

Number of cylinders and total displacement

6135	6 cylinders, 13.5 liters
6125	6 cylinders, 12.5 liters
6090	6 cylinders, 9.0 liters
6081	6 cylinders, 8.1 liters
6068	6 cylinders, 6.8 liters
4045	4 cylinders, 4.5 liters
4039	4 cylinders, 3.9 liters
5030	5 cylinders, 3.0 liters
3029	3 cylinders, 2.9 liters
4024	4 cylinders, 2.4 liters

Emissions certification

A, B, D, H, T	Non-emissions regulated
C, D, E, F, H, T	Tier 1/Stage I
D, G, H, J, K, T	Tier 2/Stage II
L, M, N, P	Tier 3/Stage III A
R, U, V, W, X, Y, Z	Interim Tier 4/Stage III B and Final Tier 4/Stage IV

Engine serial number

Emissions certification

120, 160, 220, 425	Non-emissions regulated
001, 150, 180, 250	Tier 1/Stage I
270, 275, 070, 475	Tier 2/Stage II
280, 285, 485	Tier 3/Stage III A
281, 290, 295, 495	Interim Tier 4/Stage III B

Engine controls (starting with some Tier 2/Stage II engines)

0 or 1	Mechanical controls
4 or 5	Electronic controls

Valves per cylinder (starting with some Tier 2/Stage II engines)

2	2-valve cylinder head
4	4-valve cylinder head

User type

F	OEM (John Deere Power Systems)
XX	Other letters are used to identify John Deere equipment manufacturing locations

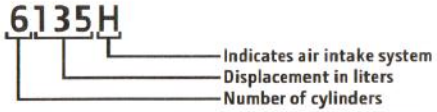
Air intake system

D	Naturally aspirated
T	Turbocharged
A	Turbocharged and aftercooled, air-to-water
H	Turbocharged and aftercooled, air-to-air

Model designation key

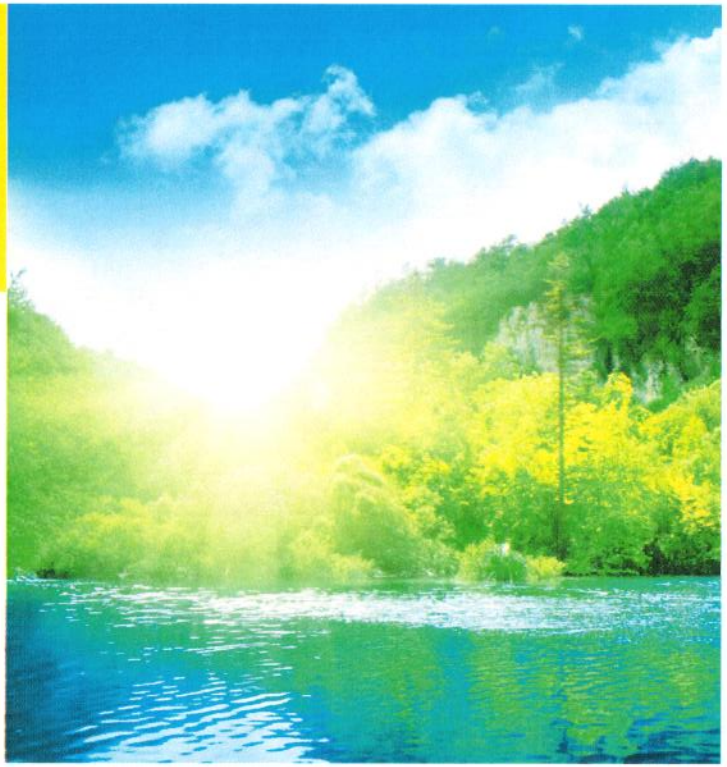
Below is a key for the engine models shown in this guide.

A model designated as 6135H is a 6-cylinder, 13.5-liter turbocharged and aftercooled, air-to-air engine. A model designated as a 4045T is a 4-cylinder, 4.5-liter turbocharged engine.



EPA Tier 1/EU Stage I	PowerTech technology
EPA Tier 2/EU Stage II	PowerTech technology
EPA Tier 3/EU Stage III A	PowerTech M, PowerTech E, or PowerTech Plus technology

Emissions information

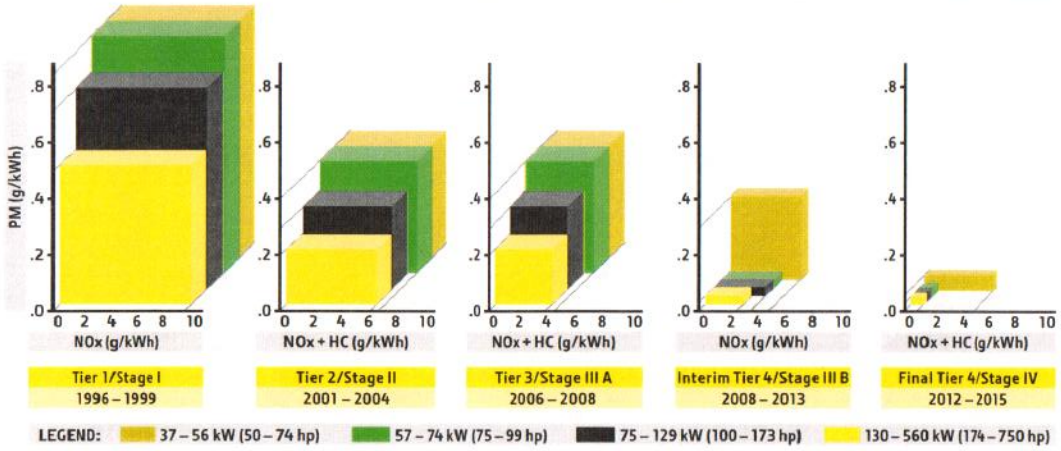


The ultimate in performance, fuel economy, and emissions compliance is available with John Deere engines.

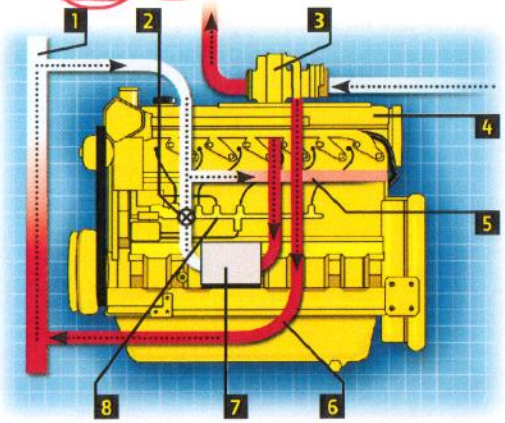
To meet emissions regulations, John Deere worked closely with equipment manufacturers to identify engine technologies that best suited their needs. We quickly recognized that no single technology would satisfy the diverse needs of our off-highway customers. This is why we created three engine solutions: PowerTech M, PowerTech E, and PowerTech Plus.

John Deere engines comply with nonroad emissions regulations for the U.S. Environmental Protection Agency (EPA), the European Union (EU), and the California Area Resources Board (CARB). John Deere also provides non-certified, Tier 1/Stage I, and Tier 2/Stage II engines for nonregulated countries.

EPA and EU nonroad emissions regulations: 37 – 560 kW (50 – 750 hp)



PowerTech Plus
4.5L, 6.8L, 9.0L, and 13.5L engines



PowerTech Plus technology

1. Cooled air from aftercooler
2. EGR valve
3. Variable geometry turbocharger
4. 4-valve head
5. Air intake manifold
6. Hot compressed air from turbocharger
7. EGR cooler
8. High-pressure common-rail fuel system

High-pressure common-rail (HPCR) and engine control unit (ECU)

The HPCR fuel system provides variable common-rail pressure, multiple injections, and higher injection pressures up to 1,600 bar (23,000 psi). It also controls fuel injection timing and provides precise control for the start, duration, and end of injection (4.5L, 6.8L, and 9.0L).

Electronic unit injector (EUI) and engine control unit (ECU)

The EUI fuel system provides variable common-rail pressure, multiple injections, and higher injection pressures up to 2,000 bar (29,000 psi). It also controls fuel injection timing and provides precise control for start, duration, and end of injection (13.5L).

4-valve cylinder head

The 4-valve cylinder head provides excellent airflow resulting in greater low-speed torque and better transient response time. There are the cross-flow design (4.5L, 6.8L, and 13.5L) and the new 4-valve U-flow head design (9.0L).

Cooled exhaust gas recirculation (EGR)

EGR cools and mixes measured amounts of cooled exhaust gas with incoming fresh air to lower peak combustion temperatures, thereby reducing NOx.

Variable geometry turbocharger (VGT)

Varies exhaust pressure based on load and speed to ensure proper EGR flow; greater low-speed torque, quicker transient response, higher-peak torque, and best-in-class fuel economy.

Air-to-air aftercooled

This is the most efficient method of cooling intake air to help reduce engine emissions while maintaining low-speed torque, transient response time, and peak torque. It enables an engine to meet emissions regulations with better fuel economy and the lowest installed costs.

Compact size

- Horsepower/displacement ratio is best-in-class
- Lower installed cost
- Mounting points for Tier 3/Stage III A engine models same as Tier 2/Stage II engine models

Engine performance

- Multiple rated speeds to further reduce noise and improve fuel economy
- Higher level of peak torque
- Better transient response time
- Greater levels of low-speed torque
- New power bulge feature (4.5L and 6.8L)
- Higher levels of power bulge (9.0L and 13.5L)

John Deere electronic engine controls

Electronic engine controls monitor critical engine functions, providing warning and/or shutdown to prevent costly engine repairs and eliminate the need for add-on governing components, all lowering total installed costs. Snapshot diagnostic data can be retrieved using commonly available diagnostic service tools.

Controls utilize new common wiring interface connector for vehicles or available OEM instrumentation packages; new solid conduit and "T" connectors reduce wiring stress and provide greater durability and improved appearance.

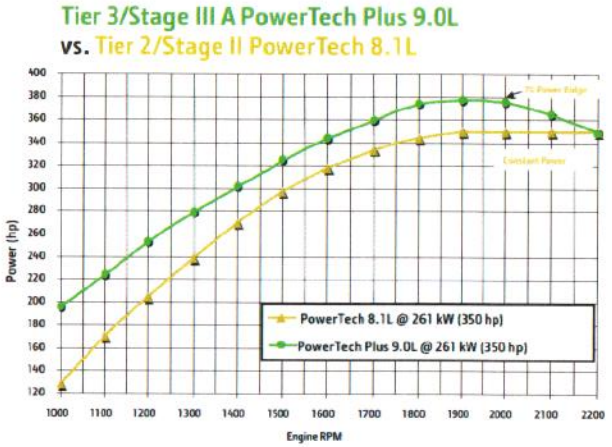
Factory-installed, engine-mounted ECU or remote-mounted ECU comes with wiring harness and associated components. Industry-standard SAE J1939 interface communicates with other vehicle systems, eliminating redundant sensors and reducing vehicle installed cost.

Additional features

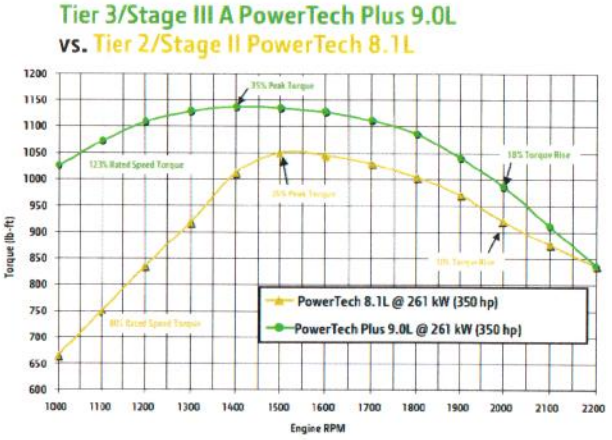
- Glow plugs (4.5L and 6.8L)
- Gear-driven auxiliary drives (4.5L, 6.8L, 9.0L, and 13.5L)
- 500-hour oil change (4.5L, 6.8L, 9.0L, and 13.5L)
- Self-adjusting poly-vee fan drive (4.5L, 6.8L, 9.0L, and 13.5L)
- R.H. and L.H. engine-mounted fuel filters (6.8L and 13.5L)
- Single-piece low-friction piston (9.0L and 13.5L)
- Optional rear PTO (9.0L and 13.5L)
- Low-pressure fuel system with "auto-prime" feature (9.0L and 13.5L)
- Directed top-liner cooling (9.0L and 13.5L)

Engine performance curves

Power curves



Torque curves



PowerTech Plus 4.5L engines

- Maintained power range:
  4045H: 111 – 129 kW (149 – 173 hp)
- New power bulge feature — up to 9%
- Higher level of peak torque — up to 29%
- More low-speed (1000 rpm) torque — up to 123% of rated speed torque
- Transient response that meets or exceeds Tier 2/Stage II
- Best-in-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 2/Stage II
- Maintained compact size and same mounting locations

Tier 3/Stage III A PowerTech Plus 4.5L engines

Engine model	Rated power		Rated speed	Peak power		Peak power	Peak torque		Peak torque
	kW	hp	(rpm)	kW	hp	(rpm)	Nm	lb-ft	(rpm)
4045HF485	111	149	2000	116	156	1800	645	476	1400
4045HF485	116	155	2200	125	167	2000	645	476	1400
4045HF485	116	155	2400	116	155	2400	574	424	1400
4045HF485	129	173	2400	129	173	2400	645	476	1400

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5.0	867	34.1	623	24.5	1055	41.5	517	1140

Ratings are subject to change.

PowerTech Plus 6.8L engines

- Maintained power range:
  6068H: 134 – 205 kW (180 – 275 hp)
- New power bulge feature — up to 13%
- Higher level of peak torque — up to 44%
- More low-speed (1000 rpm) torque — up to 145% of rated speed torque
- Transient response that meets or exceeds Tier 2/Stage II
- Best-in-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 2/Stage II
- New rear exhaust turbocharger and exhaust elbow options
- Maintained compact size and same mounting locations

Tier 3/Stage III A PowerTech Plus 6.8L engines

Engine model	Rated power		Rated speed	Peak power		Peak power	Peak torque		Peak torque
	kW	hp	(rpm)	kW	hp	(rpm)	Nm	lb-ft	(rpm)
6068HF485	134	180	2000	138	184	1600	838	618	1400
6068HF485	138	185	2200	144	193	2000	744	549	1400
6068HF485	138	185	2200	151	203	1800	838	618	1400
6068HF485	138	185	2400	138	185	2400	690	509	1400
6068HF485	144	193	2000	151	203	1800	838	618	1400
6068HF485	144	193	2000	153	205	1700	934	689	1400
6068HF485	149	200	2200	162	218	2000	838	618	1400
6068HF485	149	200	2200	168	226	1800	934	689	1400
6068HF485	149	200	2400	149	200	2400	744	549	1400
6068HF485	162	217	2000	168	226	1800	934	689	1400
6068HF485	162	217	2000	168	226	1800	1025	756	1400
6068HF485	168	225	2200	181	242	2000	934	689	1400
6068HF485	168	225	2200	185	247	1800	1025	756	1400
6068HF485	168	225	2400	168	225	2400	838	618	1400
6068HF485	181	243	2000	185	247	1800	1025	756	1400
6068HF485	187	250	2200	198	266	2000	1025	756	1400
6068HF485	187	250	2400	187	250	2400	934	689	1400
6068HF485	205	275	2400	206	275	2400	1025	756	1400

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
106	4.2	127	5.0	1120	44.1	611	24.1	1058	41.7	678	1495

PowerTech Plus 9.0L engines

- Expanded power range:
  6090H: 168 – 298 kW (225 – 400 hp)
- Best-in-class power density
- Higher level of power bulge — up to 11%
- Higher level of peak torque — up to 50%
- More low-speed (1000 rpm) torque — up to 150% of rated speed torque
- Transient response that meets or exceeds Tier 2/Stage II
- Best-in-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 2/Stage II
- New compact size

Tier 3/Stage III A PowerTech Plus 9.0L engines

Engine model	Rated power		Rated speed	Peak power		Peak power	Peak torque		Peak torque
	kW	hp	(rpm)	kW	hp	(rpm)	Nm	lb-ft	(rpm)
6090HF485	168	225	2000	187	251	1800	1095	807	1500
6090HF485	168	225	2200	187	251	2000	1095	807	1500
6090HF485	168	225	2200	168	225	2200	984	726	1500
6090HF485	187	250	2000	205	275	1800	1201	886	1500
6090HF485	187	250	2200	205	275	2000	1201	886	1500
6090HF485	187	250	2200	187	251	2200	1095	807	1500
6090HF485	205	275	2000	224	301	1800	1313	968	1500
6090HF485	205	275	2200	224	301	1800	1313	968	1500
6090HF485	205	275	2200	205	275	2200	1201	886	1500
6090HF485	224	300	2000	243	325	1800	1421	1048	1500
6090HF485	224	300	2200	243	325	2000	1421	1048	1500
6090HF485	224	300	2200	224	300	2200	1313	968	1500
6090HF485	242	325	2000	261	350	1800	1530	1128	1500
6090HF485	242	325	2200	261	350	2000	1530	1128	1500
6090HF485	242	325	2200	242	325	2200	1421	1048	1500
6090HF485	261	350	2000	279	375	1800	1554	1146	1500
6090HF485	261	350	2200	280	375	2000	1543	1138	1500
6090HF485	261	350	2200	261	350	2200	1530	1128	1500
6090HF485	280	375	2200	280	375	2200	1543	1138	1500
6090HF485	298	400	2200	298	400	2200	1550	1143	1500

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
118	4.7	136	5.4	1208	47.6	630	24.8	1113	43.8	901	1986

Ratings are subject to change.

PowerTech Plus 13.5L engines

- Maintained power range:
  6135H: 261 – 448 kW (350 – 600 hp)
- Best-in-class power density
- Higher level of power bulge — up to 14%
- Higher level of peak torque — up to 43%
- More low-speed (1000 rpm) torque — up to 138% of rated speed torque
- Transient response that meets or exceeds Tier 2/Stage II
- Best-in-class fuel economy
- Lower rated speeds to reduce noise and improve fuel economy
- Cold-starting capabilities that meet or exceed Tier 2/Stage II
- Compact size

Tier 3/Stage III A PowerTech Plus 13.5L engines

Engine model	Rated power		Rated speed	Peak power		Peak power	Peak torque		Peak torque
	kW	hp	(rpm)	kW	hp	(rpm)	Nm	lb-ft	(rpm)
6135HF485	261	350	1900	298	399	1700	1834	1353	1400
6135HF485	261	350	2100	298	400	1900	1602	1182	1400
6135HF485	261	350	2100	261	350	2100	1602	1182	1400
6135HF485	298	400	1900	335	449	1700	2063	1521	1400
6135HF485	298	400	2100	336	450	1900	1834	1353	1400
6135HF485	298	400	2100	298	400	2100	1834	1353	1400
6135HF485	317	425	2100	336	450	1800	2063	1521	1400
6135HF485	336	450	1900	371	498	1700	2290	1689	1400
6135HF485	336	450	2100	373	500	1900	2063	1521	1400
6135HF485	336	450	2100	336	450	2100	2063	1521	1400
6135HF485	373	500	1900	409	548	1700	2430	1792	1400
6135HF485	373	500	2100	373	500	2100	2290	1689	1400
6135HF485	373	500	2100	400	536	1800	2290	1689	1400
6135HF485	392	525	2100	410	550	1800	2430	1792	1400
6135HF485	410	550	2100	423	567	2000	2430	1792	1400
6135HF485	410	550	2100	410	550	2100	2430	1792	1400
6135HF485	448	600	2100	448	600	2100	2550	1881	1600

Bore		Stroke		Length		Width		Height		Weight	
mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
132	5.2	165	6.5	1334	52.5	855	33.7	1512	59.5	1493	3292